Time of Use Carbon: Decreasing Carbon Penalties by Shifting When We Use the Grid

AEG Stakeholder Charrette

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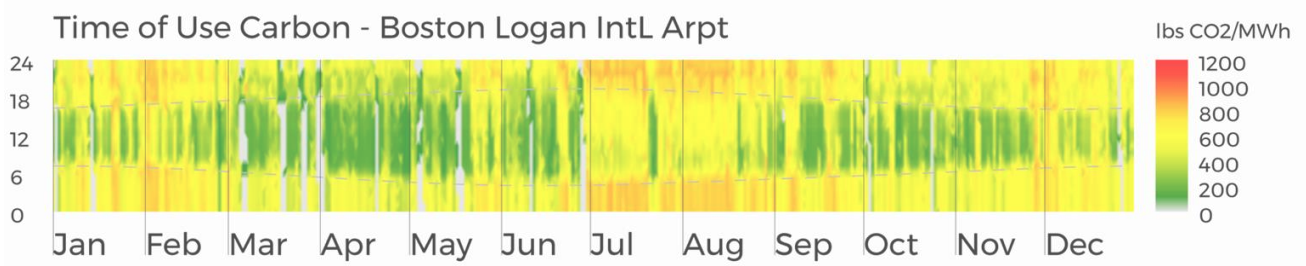
Time of Use Carbon

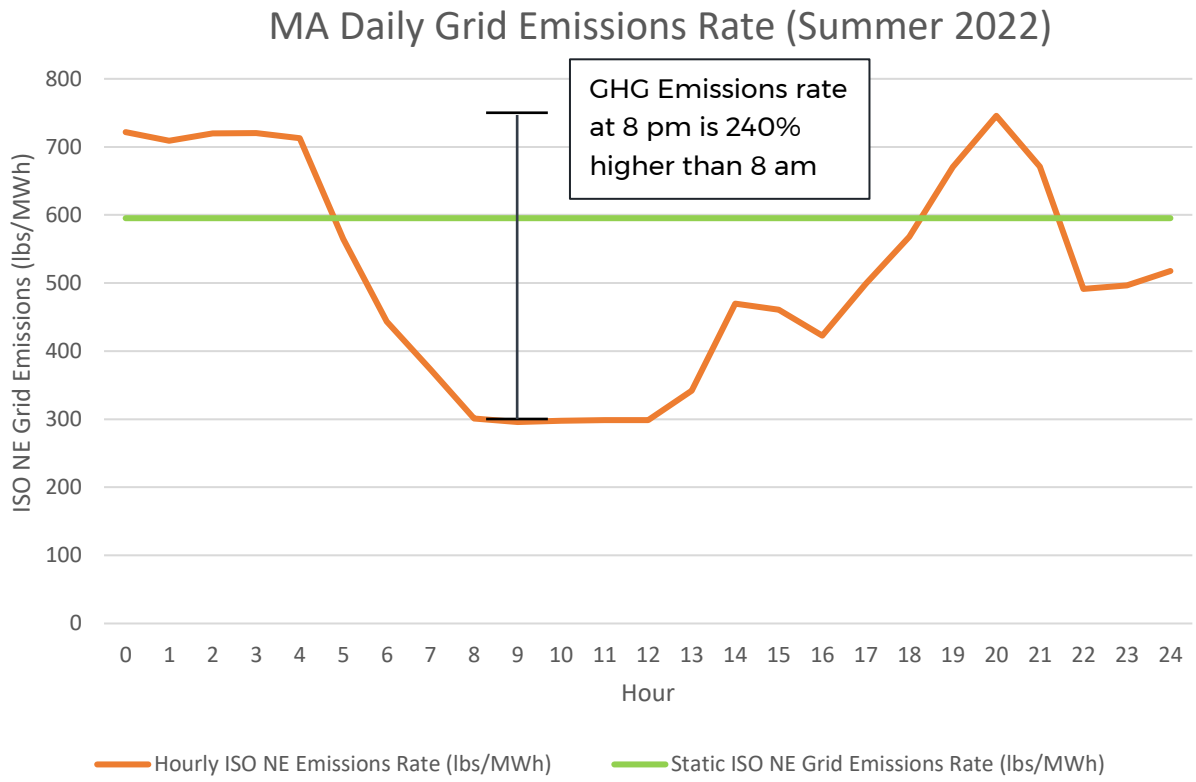
Overview:

- Grid emissions are lowest during the day when renewables are online
- Peak load morning and nighttime (~6-8 am & ~6-8pm)
- Lower grid demand at nighttime when grid has higher emissions

Opportunity

- Beat static emissions rate during low time of use (hourly) carbon grid emissions by shifting WHEN a building uses grid electricity





Emissions vs. Carbon Penalties

Emission Reductions:

- Energy Efficiency reductions could be coupled with time of use carbon reductions to further drive savings
- Lower grid demand at nighttime when grid has higher emissions
- Demand charges do not incentivize using grid during low emission times

Carbon Penalties

- BERDO 2.0 (Boston) and BEUDERO (Cambridge) emissions reporting and penalties based on static emissions rates
- Currently no incentive for making time of use carbon reductions

Boston

~$2-9 Million

Average Commercial Office Building
BERDO Carbon Penalties (2025-2050)

Cambridge

~$7-13 Million

Average Commercial Office Building
BEUDERO Carbon Penalties (2025-2050)

Key Obstacles

Demand Response Infrastructure

Demand responsive infrastructure installed at bulding level (BMS, control sequences, submeters)& training for operations teams

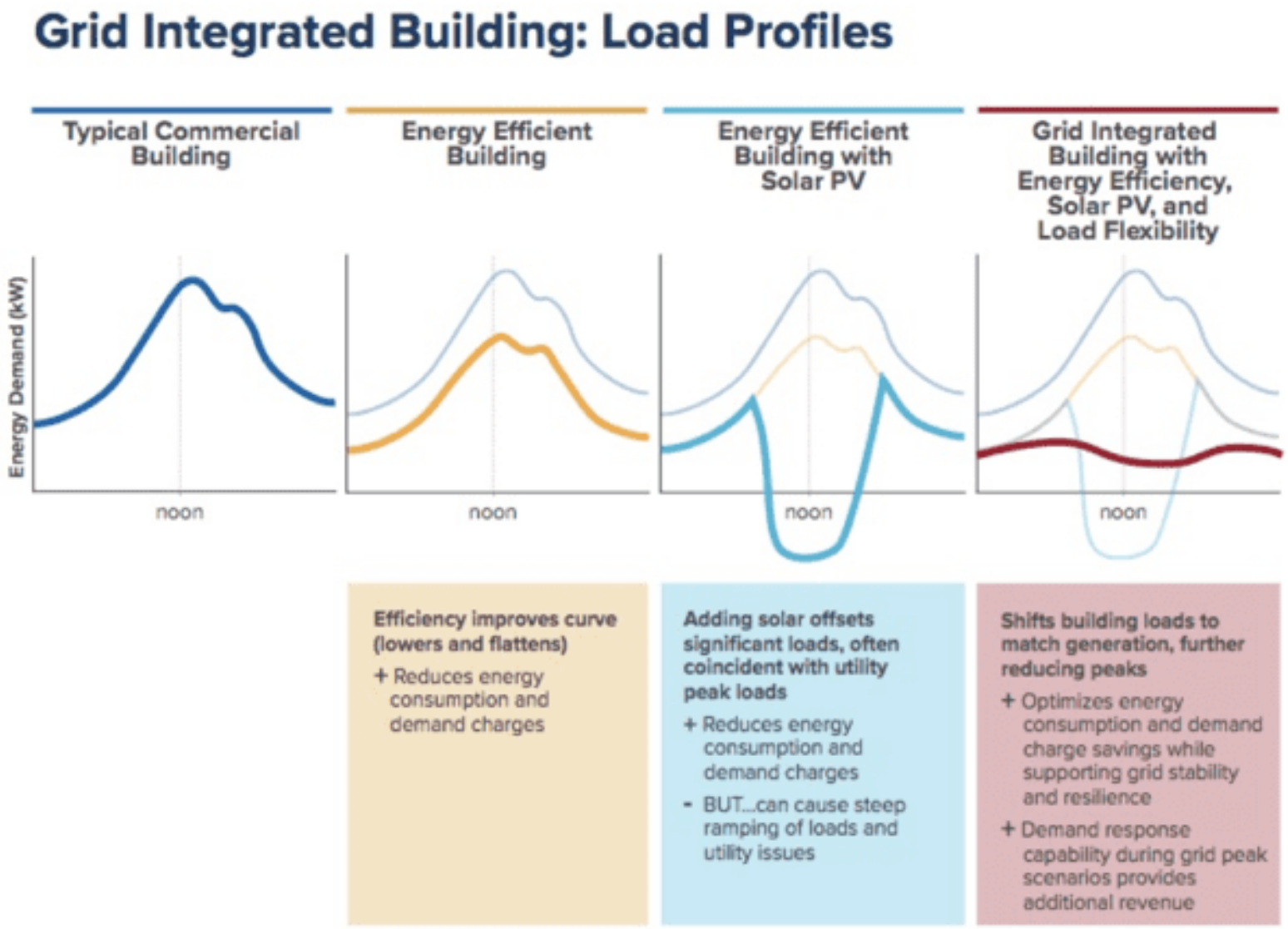
Energy Storage & Renewables

Finding physical space in existing buildings & working with code officials to promote the use of battery and/or thermal storage coupled with onsite renewables

Carbon Policy

Incentivize time of use carbon emissions reductions by allowing buildings to use realtime hourly data for emissions calculations (BERDO / BEUDERO)

1. **Hourly Carbon Emissions reductions by shifting WHEN we use the grid**
2. **Revenue from reduced demand charges & carbon penalties**
3. **Reduce stress on grid during high usage times**



Source: RMI

Regarding Buildings and Construction, to achieve Boston's Carbon & Equity goals, a critical obstacle to collaboratively overcome within the next 12 months is:

Identify ***design solutions*** *to enable buildings to make* ***time of use carbon reductions*** *to maximize GHG reductions while minimizing financial burden of carbon taxes.*

Thank you

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